DOCUMENT RESUME

ED 244 248 CS 007 648

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TITLE An Investigation of Poor Readers' Use of a Thematic Strategy to Comprehend Text.
PUB DATE 14 Apr 83
NOTE 55p.; Paper presented at the Annual Meeting of the American Educational Research Association (Montreal, Canada, April 11-15, 1983).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC03 Plus Postage.
DESCRIPTORS Academic Aptitude; Cohesion (Written Composition); Content Area Reading; Intermediate Grades; Learning Strategies; Prior Learning; *Reading Comprehension; Reading Materials; *Reading Research; *Reading Strategies; *Recall (Psychology); Schemata (Cognition); Social Studies
IDENTIFIERS *Adjunct Aids; *Thematic Organizer

ABSTRACT

A two-part study investigated the effects of a text adjunct on poor readers' recall and comprehension. The text adjunct, a thematic organizer, was designed to define explicitly the central theme of a passage, relate the theme to students' prior knowledge, and provide cohesion among the ideas of the passage to accommodate text structure. Subjects in the first part of the study were 85 fifth grade students classified as below average readers. Those in the second part were 24 fourth, fifth, and sixth grade poor readers. Materials included social studies passages and directions for retelling or literal and inferenial questions. Results favored the use of the thematic organizer to increase performance on literal and inferential questions and literal and inferential retellings. The findings suggest that the strategy facilitated more complete recall of structurally important text ideas. (Author/FL)

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An Investigation of Poor Readers' Use of a Thematic Strategy to Comprehend Text

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Paper presented at the Annual Meeting of the American Educational Research Association, Montreal, Canada, April 14, 1983.

CS 007648

ABSTRACT

This study investigated the effects of a text adjunct on poor readers' comprehension and recall. The text adjunct, a thematic organizer, was designed to define explicitly the central theme of the passage, relate the theme to students' prior knowledge, and provide cohesion among the ideas of the passage to accomodate text structure. The subjects were eighty-six fifth grade students and twenty-four fourth, fifth, and sixth grade students who were classified as below average readers. Materials included social studies passages and directions for retelling and/or literal and inferential questions. Over a series of passages, results favored the use of the thematic organizer to increase performance on literal and inferential questions and literal and inferential retellings. This study suggested that the thematic strategy facilitated more complete recall of structurally important text ideas. The discussion focuses on the use of the thematic organizer as a strategy that aids students' ability to impose their own structure on a text to facilitate comprehension and recall.

If you have ever read an article or a text and found it difficult to understand, you may have concluded that you needed to try various strategies, such as rereading or referring to additional resources, to help you interpret the author's message. Perhaps you have been dissuaded from completing a reading because you found that the author chose a complicated organization or provided inadequate information about concepts that were critical for your comprehension. Thinking of experiences when you were frustrated as a reader may help you to understand poor readers' inability to comprehend ideas that are presented in content materials. This paper reports the results of two studies which investigated whether a prereading strategy could facilitate poor readers' comprehension of social studies passages.

Poor readers' inability to comprehend content material is symptomatic of various factors. These may include a lack of knowledge of the the major concepts prior to reading, an inability to integrate previous knowledge with information in the text, and/or an inability to access relevant prior knowledge. Often poor readers can't elaborate upon previous experiences, have inappropriate strategies for using what they know, or lack criteria to assess their comprehension.

Text factors may contribute also to students' comprehension difficulties. The text may be written in an ambiguous manner, lacking coherence or unity among the concepts. Texts such as these are often loaded with abstract concepts that are not defined and/or numerous details that are not related explicitly to the major theme.

This paper is organized to include the following information. First, we describe some problems noted with social studies text organization and suggest a teaching strategy to aid students' comprehension when reading these texts. Second, a brief review of the literature is reported to provide research and theoretical support for this teaching strategy. The findings from an interview with fifth grade poor readers is presented to provide additional rationale for the studies discussed in this paper. Next, we describe the results of two studies in which a thematic organizer strategy designed to facilitate text comprehension was presented to fourth, fifth, and sixth grade students with below average reading achievement. An interpretation of the relationship between the strategy and text comprehension concludes this paper.

To prepare for your reading of this paper, pause and interpret the following statements: (1) Comprehension is dependent upon numerous factors, and (2) Text organization and cohesion can influence reading comprehension.

Background

In a perusal of the most commonly used social studies texts, we found that complicated and abstract concepts such as the War of 1812, the passage of the U.S. Constitution, and industrialization, were each introduced and discussed in as little as three paragraphs. Many details about each concept were presented but the theme of the passage and the "relatedness" of these ideas would need to be interpreted by the reader. We concluded that a reader would need an extensive background in these areas to be able to comprehend the theme and relate it to its many supportive

details.

Our analysis of the texts indicated that the prevalent structure of the passages was descriptive top-level. General statements were followed by lists of details. In the majority of the passages that we reviewed the theme was implied by the author. Usually there were no explicit connectives which demonstrated a relationship among the superordinate thematic concept, the superordinate ideas and/or the subordinate ideas of the passage. The text could be plotted as illustrated in Figure 1. The dotted lines represent the relationships among the ideas which the reader would be required to interpret.

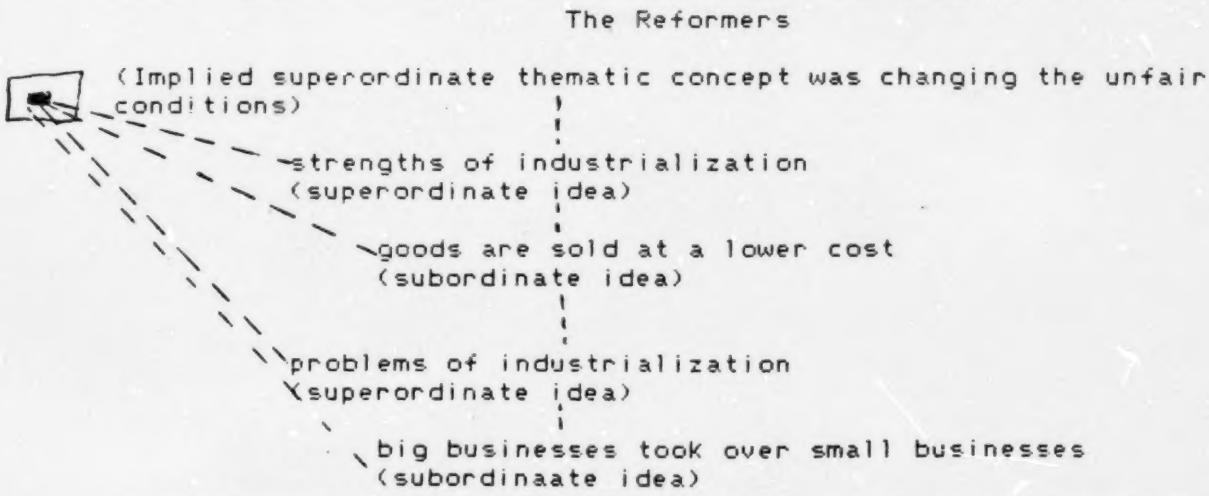

Figure 1. Plotting of "The Reformers" passage

To illustrate more specifically the nature of the texts that we examined, we present this example. In one fifth grade social studies book, the concept of social reform in industry and on farms is introduced and discussed in seven paragraphs. While the theme of this passage is reforming conditions for the workers (which is never explicitly stated), each paragraph starts with a topic sentence that is never related to this implied

thematic concept. For example, the superordinate ideas introduced in each paragraph were: strengths of industrialization, problems of industrialization, contributions of muckrakers, and poor working conditions at factories and on farms. None of these has an inherent association with the theme of reform and the author never explains the association (e.g., the author could have stated that the problems of industrialization or poor working conditions contributed to the need for reform). The major idea of each paragraph is followed by "lists" of details (e.g., Standard Oil had become so big it forced other oil companies out of business. Standard Oil was run by John D. Rockefeller. The rich built palaces, while others had barely enough to eat.) that are not clearly related to each other or to the superordinate ideas.

In the text these seven paragraphs are presented under the subtitle "The Reformers". The terms used to illustrate the theme throughout the passage are reform, reformers, and muckrakers but these are never defined nor is their association explained (i.e., the author could have indicated that the word muckrakers is another word used to describe the reformers and that the reformers were people who wanted to make changes in industry and on farms). This theme of reform remains vague and abstract throughout the passage. By choosing this text structure, the author is requiring the reader to organize the ideas and infer their relatedness. This task is a weighty one for all readers but may be especially difficult for the poor reader.

In a preliminary investigation, a group of middle school students disassociated from the experiments reported in this

paper were interviewed to determine their understanding of the "Reformers" passage. When we asked this group of poor readers to read and talk about the passage described above, our concerns were supported. These students, who otherwise were quite verbal in our conversations, recalled very little of the passage. Even when the students were asked to go back to the passage to find information, students could not discuss the 'reform" concept. We assumed that their recall performance was representative of their level of comprehension. With probing, most of the students were able to discuss the sentence about children working in factories at a young age for 15 cents an hour, but none could explain any other detail or relate any of the details to each other or infer the theme of the passage. We asked these students to read several other social studies passages and found that limited comprehension and recall seemed to be universal across texts that had a similar structure.

For the studies presented here, we developed a text adjunct, called a thematic organizer, which was intended to: (1) highlight systematically and explicitly the central theme of the text, (2) relate the theme to experiences and/or knowledge that the students already possessed, and (3) provide cohesion among the ideas to accomodate the text structure. Bartlett (1978) and Alvarez (1983) demonstrated that students in the secondary school who were instructed to note top-level structure, such as the thematic concept, improved their recall. In this study, we questioned whether the thematic orgarizer designed to compensate for a given text structure would change the quality and quantity of recall statements of upper elementary students who had reading

problems.

Rationale

This study extends previous research and is supported by several theoretical positions. First, schema theorists suggest that providing and extending background experiences and knowledge prior to reading may enhance readers' comprehension of difficult and/or abstract concepts. Since texts are never completely explicit, the reader must rely on preexisting schemata to provide plausible interpretations. Yet there is much evidence that poor readers are not using schema appropriately and/or are unaware of the "degree" to which the information they are reading is consistent with their existing knowledge (e.g., Bartlett, 1932; Bransford, 1979; Spiro, 1977). Also there is evidence that students who don't spontaneously use their schema as they read will do so if given explicit instructions (e.g., Bransford, 1979). These studies suggest that helping poor readers learn to learn involves changing their approach to comprehension tasks.

Secondly, students who do have problems extracting central idea(s) from their reading may have limited recall as a consequence. When Beck, McKeown, McCauslin, and Burkes (1979) analyzed current reading practices in reading instruction they found that directions in manuals often require teachers to ask readers to evaluate and interpret a story before determining whether they can understand the central ideas. Beck and her colleagues argued that central ideas form the basis for comprehension and indicated that without central ideas firmly established, students fabricate story events rather than produce

plausible details and/or inferences about the story. This conclusion matched our preliminary investigation. When students did not understand the central theme, their retellings were either irrelevant or quite limited.

A question arises, though, related to whether students infer central ideas from the details or vice versa. Researchers who have studied hierarchical organization of text have found that those propositions that are higher-order and more central in the hierarchy are more accurately recalled and more rapidly verified (e.g., Kintsch, 1974; Kintsch and van Dijk, 1978; Meyer, 1975). Their conclusions imply that details (such as details found in whole sentences or paragraphs that serve to illustrate main ideas presented in other sentences) would not have a facilitative effect on memory of central ideas. This notion was further supported by the research conducted by Reder and Anderson (1980) who asked college students to read a complete passage and a summary of the central ideas. They concluded that "details do not support memory for the central, important ideas. In hierarchial representations of text, details can be retrieved only by first retrieving the higher level points", p.132.

Thirdly, while other studies have investigated stategies that produce or evoke schema prior to reading to aid comprehension and recall, no studies have attempted to compensate for text structure while combining the use of a schema-directed activity with the teaching of the central theme. In several studies the provision of thematic titles or statements for ambiguous passages aided comprehension (e.g., Adams, 1977; Adams &

Collins, 1977; Bransford & Johnson, 1972; Bransford & McCarrell, 1974; Dooling & Lachman, 1971; Schallert, 1976). In our work with social studies passages, however, the titles given by the author were so global that they were not a sufficient clue or stategy to provide or evoke preexisting knowledge for the content. For example, in the Reformers passage, the title was as vague and abstract as the passage.

Other forms of prereading activities or preorganizers have been used to develop prior knowledge to aid reading comprehension. Advance organizers (Ausubel, 1960, 1968), structured outlines (Glynn and DiVesta, 1977), and structured overviews (Barron, 1969; Earle, 1969; and Earle and Barron, 1973) are some of the strategies that have have been been used to develop pre-reading schema. Recent reviews of advance organizer and graphic preorganizer research indicate that these strategies have produced variable effects but overall facilitate a small but positive effect on reading comprehension and retention (e.g., Luiten, Ames, & Ackerson, 1980; Mayer,1978; Moore & Readance, 1980; Singer, 1983). Unfortunately the varied procedures and definitions of advance organizers used by previous researchers have contributed to the mixed results in the findings. A common recommendation from reviewers of this literature is the need for a precise definition of the organizer and a clear set of directions for its construction. Clark and Bean (1982) further recommended that studies of the effects of pre-organizers on reading comprehension provide a thorough and definitive assessment of the nature of the learners' comprehension and the structure of the text.

Justification

This study was conducted to determine if the proposed teaching strategy developed to accommodate a particular text structure, define the theme, and relate the theme to students' prior knowledge would facilitate reading recall and comprehension. Since no one factor determines comprehension, this study attempted to manipulate several variables each of which have been found to have effects on reading comprehension.

If memory for text requires a constructive process involving the entire knowledge system of the student there needs to be a close association between prior information and text content so that reconstruction can occur (Brown, 1975). Therefore it was presupposed that an instructional strategy should extend the students' prior knowledge to develop a "cognitive readiness" for new information in the text. Furthermore, it was decided that directions to think about previously learned information would be coupled with an explicit description of how these ideas relate to the central or thematic concept of the passage. Since the interaction of students' preexisting knowledge and text content is either facilitated or complicated by the text structure, this study also tested the hypothesis that a student imposed structure on the text could improve comprehension and retention.

It was planned that the use of a comparison top-level structure for the thematic organizer would present an integrative view of the central theme and the supportive details. By relating the theme to several clear, definitive examples, it was predicted that the students could impose this knowledge of the

concept and its attributes on the text to compensate for the incoherent listing of ideas. Further it was anticipated that details would be understood once the central theme was established for the reader.

Thematic Organizer

A thematic organizer was constructed by modifying a procedure developed by Alvarez (1983). Like Ausubel's (1960, 1968) use of advance organizers, it was hypothesized that the thematic organizer would activate the reader's prior knowledge and enable the reader to assimilate ideas that were previously unrelated. The thematic organizer differed from Ausubel's organizer in that it was written on a level commensurate with the students' reading ability and included information on a concrete rather than on a higher or abstract level. Like the advance organizer, the thematic organizer was written in prose. Additionally, the thematic organizer was written to adhere to specified guidelines for organization and structure.

The thematic organizer was defined as a preview strategy to be developed by the teacher and used as an adjunct aid. Its purpose was to activate students' prior knowledge, relate this knowledge to the central theme of a selected passage, define the theme by explaining its attributes, and ask students to predict what would occur in the passage. The thematic organizer was written to present a cohesive message about the theme of the passage.

Specifically, the thematic organizer was written as follows. For the first experiment in this paper the organizer was written in two sections. The first section contained four

paragraphs. The first paragraph "set the scene" by introducting the thematic concept in a setting believed to be relevant to the students' experience. The second paragraph presented several examples which further defined the concept. The third paragraph presented an analogous relationship between the concept as defined by the students' prior experiences and the concept as presented in the text. Further, it introduced an explicit definition of the thematic concept. Various attributes of the concept from the passage were added in the fourth paragraph to further illustrate the definition of the concept. This paragraph also presented two sentences from the text and asked the student to explain these in written form as a way to make predictions about the text. (For the purpose of this study it was planned that no feedback would be given to students on their predictions.)

This section of the thematic organizer could be plotted as illustrated in Figure 2.

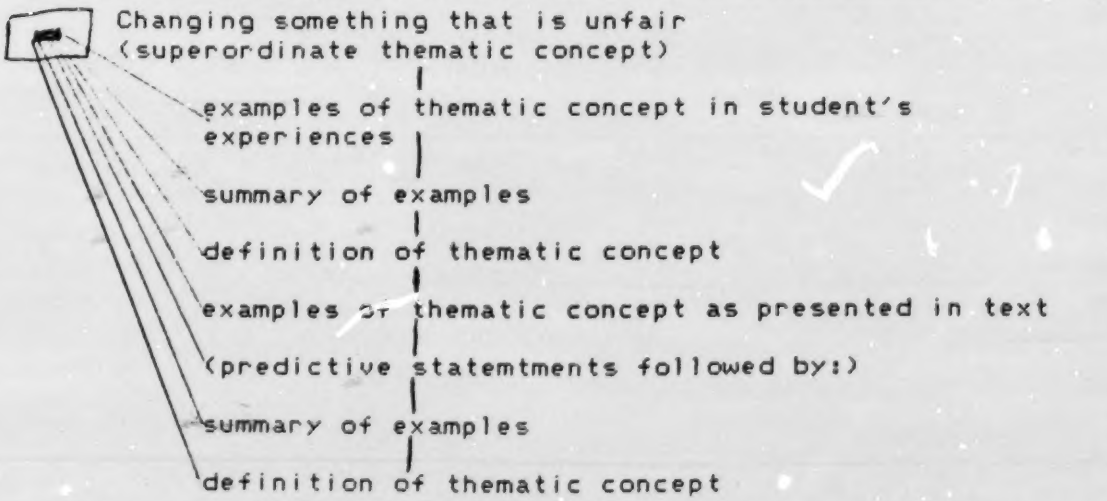
Changing something that is unfair
(superordinate thematic concept)
examples of thematic concept in student's experiences
summary of examples
definition of thematic concept
examples of thematic concept as presented in text
(predictive statemtments followed by:)
summary of examples
definition of thematic concept

Figure 2. Plot of the thematic organizer

The solid lines represent the explicit connectives, those words or phrases that were used to relate ideas across sentences and paragraphs. Using the cohesion categories presented by Halliday and Hasan (1976), these connectives were used: (1) reference (e.g., These poor people could not own their own land. They did not have much money for food or houses,); (2)conjunction (e.g., The reformers were also called muckrakers.); and (3) lexical (e.g., The reformers tried to help people. These reformers wanted everyone to have a fair chance to make a living.).

If you now look back to the first five paragraphs of this article you may find that they were written to exemplify the first part of a thematic organizer. These paragraphs include: (1) examples of reading problems that you may have experienced, (2) poor readers' problems with text (thematic concept of paper), (3) examples of factors that contribute to poor readers' reading difficulties, and (4) predictive statements.

The second part of the thematic organizer was a set of six interpretive statements which presented attributes and non-attributes of the concept. Written directions were given to ask the students to read these statements and select the ones that they thought were correct either during or after reading. (See appendix for example of a thematic organizer. Explicit connectives are underlined for this paper but were not underlined in the study.)

As can be readily discerned, the thematic organizer provided numerous and varied elaborations on the thematic

concept. These elaborations were intended to impact upon recall at the literal and inferential level. The use of elaborations during input has been supported (e.g., Reder 1980) as a method to establish connections between sentences and relationships among ideas and to aid integrated recall. Since the implied theme was made explicit by the thematic organizer, and the relationship of some attributes of the thematic concept were related explicitly to each other, it seemed important to assess student's ability to recall literal information and generate plausible inferences beyond the explicit information presented on the text and/or thematic organizer.

EXPERIMENT 1

The purpose of this study was to determine the effect of the thematic organizer on literal and inferential comprehension as determined by a retelling activity.

Sample

The sample for this study was eighty-six fifth grade students who were classified as below average readers (stanines 2, 3, and 4) on the total reading subtest of Comprehensive Tests of Basic Skills (1977). All students were pretested on the targeted concept two weeks prior to the study. For the pretesting, the students were asked to define and/or discuss three social studies concepts, one of which was the targeted concept (i.e. reform). The classroom teachers presented these questions during their regular social studies period. None of the students was able to define any of the concepts.

Materials.

The Reformer passage taken from a fifth-grade social studies text was utilized for this study. Although this text was used by the students' school, this passage had not been introduced to the students. The title of the passage which presented the implied and thematic concept remained on the passage presented to the students. To aid student ability to refer back to selected paragraphs of the passage, each paragraph was numbered in the margin. In addition to analyzing the kinds of concepts and lack of cohesive ties within the passage, use of the Fry Readability Formula (1977) yielded a 7.0 reading level for the passage.

A thematic organizer was written to correspond to the description and guidelines presented earlier in this paper. The thematic organizer was written on approximately the third grade reading level (as determined by the Fry formula) in order to approximate the actual reading level of the students in the sample.

The passage, which had 509 words with 39 sentences, was parsed into 57 idea units by five independent raters who had been trained prior to the study. Interrater reliability for parsing the Reformer passage was .97. The process of dividing the text into perceived idea units was favored over propositional analysis for several reasons. First, the passages chosen for this study required reader interpretation to form relationships among the various ideas presented by the author. A propositional analysis (such as the one proposed by Turner and Greene, 1977) would provide the interpretation of only that person who completed the analysis and somewhat different analyses if the

same passage was analyzed by different people. Conversely, by asking several readers to identify their perceived idea units we were able to identify a set of idea units that represented different perspectives. As can be seen by the reliability coefficient reported above, there was a high degree of agreement among the raters. The few disagreements were resolved by the group so that a final set of idea units could be established. Second, since the ultimate goal of parsing the passage was to analyze student retellings, we chose to compare the retellings against a criterion that represented the structure of the text as a group of readers perceived it. (For a complete discussion of this issue, see Estes and Wetmore, 1983.)

Additionally the idea units were evaluated in several ways. The mean word length of the idea units was 8.9. Idea units were rated for structural importance by the independent raters using the method devised by Johnson (1970) to identify four levels of ideas, from least to most important units. Inter-rater reliability was .97. The structural units were analyzed for action versus description content (see Brown & Smiley, 1977). The division of these was relatively equitable across the four levels of importance. It was determined that differential recall of these units would be relatively uncontaminated by this distribution. Also, each of the four levels of structural importance occurred approximately equally in each section of the text. It was concluded that recall of important units would not be contaminated by primacy or recency effects.

Procedure

Stratified randomization by stanine level was used to

place the students in one of four groups. Four examiners, including the two experimenters, were randomly assigned and rotated across the various groups. Group A received the two sections of the thematic organizer and text passage; Group B received the first section of the thematic organizer and text passage; Group C received the second part of the thematic organizer and text passage; and Group D, the comparison group, received only the text passage. Time spent during reading was controlled for all groups.

The students met with the examiners in groups of five and six. Groups A, B, and C were told to read all of the materials and follow the written directions. Students in Group D were told to read and study the passage. All students were told that they would be asked to retell the passage after they finished reading. After reading the students were asked to complete an unrelated buffer task which required students to indicate their perceptions of their reading ability, their ability to understand the selected passage, and the difficulty level of the passage. It was postulated that this four-minute task would create an interference for memory of short-term surface features.

Then the students were interviewed individually on a random-order basis. Each student was asked: "Tell everything that you can remember about what you just read". When the student finished retelling, s/he was probed one time with "Can you remember anything else?". All retellings were audio-taped for later analysis and verification. Recall was assessed immediately after the reading (Trial 1) and after a two-day delay (Trial 2).

Scripts of students' retellings were typed and divided into idea units. These units were classified as either textually explicit or textually implicit using the definitions presented by Pearson and Johnson (1978). The independent raters matched the textually explicit units to their text counterparts and/or determined if the textually implicit units were plausible. Units were considered plausible at the inferential level if they contained at least one element or event from the passage and/or if they described relationships between ideas presented in the passage (Linden & Wittrock, 1981). A scale of 0-3 was used to rate the degree to which the textually explicit unit preserved the meaning of the passage unit and the textually implicit unit seemed to be plausible. These specific scoring directions were followed:

Textually Explicit

3 - if the subject's idea unit is a verbatim recall or good paraphrase of the original unit.

2 - if the subject's idea unit is a verbatim recall or good paraphrase of a major part of the original unit.

1 - a somewhat vague paraphrase or only a small fragment of the original idea unit is represented.

0 - incorrect response, no text related information

The score for the literal units were weighted by two factors: (1) the rated structural importance of the text unit and (2) the degree to which the recalled unit preserved the meaning of the text unit. It was possible, for example, for a unit to be rated a 4 in structural importance and a 3 for a verbatim recall. The two numbers were multiplied (4 X 3) to determine the score for

each unit that was labeled as a literal retelling unit (see Thomas and Bridge, 1980).

Textually Implicit

3 - if the subject produces a good extension of the concept using background experiences
or produces a complete thought of plausible inferred information.

2 - produces partial statements of inferred information.

1 - produces verbatim or restated information that was presented on the thematic organizer. Discount all units at this level.

0 - incorrect response, no text related information

As can be noted, the raters were instructed to rate all statements that merely restated (or reproduced verbatim) the information that was presented on the thematic organizer. Since the organizer presented elaborations which included plausible inferences about the thematic concept, student references to these in the retellings were identified and eliminated from the data analysis so that the results were not biased in favor of the organizer treatment. Inferences that were scored as a 2 or 3 had to be those that were generated beyond the information on the organizer and/or text passage. Inter-rater reliability across three independent raters on the scoring of the protocols was .97.

Analysis of the data

Using a 4 (groups) X 2 (trials) design, two separate two-way analyses of variance with repeated measures on each level of comprehension was used to analyze the data. In the first analysis no significant differences were found among the group

means for literal comprehension across the groups and trials, F (3,82) = 0.63, p> .05 (Combined means for trials 1 and 2 were: Group A = 13.27; Group B= 13.20; Group C = 16.57; Group D = 11.67).

The second analysis revealed a significant treatment effect for responses at the inferential level across the groups and trials, F (3,82) = 18.33 p < .01. (Group means, the main effect, for the combination of repeated measures were: Group A = 8.02; Group B = 3.84; Group C = 3.43; Group D = 1.12). A Newman-Keuls *post hoc* test indicated that on Trial 1 Group A was significantly different from Groups B, C, and D (p <.01) and Group C was significantly different from Group D (p < .05). On Trial 2, the Newman-Keuls test indicated that Group A was significantly different from Group D (p < .01).

INSERT TABLE 1 ABOUT HERE

An interaction effect was found to be significant which indicated that the groups were differentially affected across the trials. See Figure 3.

INSERT FIGURE 3 ABOUT HERE

The analysis indicated that these four groups differed on inferential comprehension. On immediate recall, the ability to discuss and elaborate upon the implied concept was enhanced by the relevant framework that was presented prior to and during textual reading (combined parts of the thematic organizer). On the delayed recall measure, Group A receiving the combined treatment recalled less than they did during the imme-

diate assessment and "forgot" more than the comparison group (interaction effect) but they remained different from all of the groups and significantly different from Group D, the comparison group.

Secondly, the data were analyzed to determine whether the groups differed in the ability to recall structurally important units or preserve the meaning of the text ideas. Since the treatment groups were "primed" on textually implicit information (i.e. the implied concept was made explicit prior to reading through several examples), it was presupposed that these students may overlook literal ideas as they read to understand the implied concept (spending more time on the superordinate idea without attending to details). The comparison of the groups' data on literal comprehension indicated that the experimental groups did "no worse" on literal comprehension. Also, an inspection of the protocols revealed that subjects across groups on the first trial recalled approximately the same amount of most important (4's and 3's) and least important (2's and 1's) idea units. In Trial 2, subjects in the treatment groups recalled more of the most important idea units while more subjects in Group D recalled more of the least important units. None of the subjects in the comparison group indicated that they interpreted the meaning of the thematic concept. Instead they recalled specific details from the passage and did not conjecture a relationship between these details. Conversely, most of the students in the three groups receiving part or all of the thematic organizer presented a definition of the thematic concept in their retellings.

INSERT TABLE 2 ABOUT HERE

Another finding was noted when students' idea units were compared for the degree to which they preserved the meaning of the original passage units. While all students recalled approximately the same number of literal propositions or idea units, students receiving all of the treatments on trial 1 and the total thematic organizer or the first part of the organizer on trial 2, recalled more complete propositions (3's and 2's) than students who read only the text. Across groups and trials, the responses of these treatment students were rated as having higher meaning retention and completeness.

INSERT TABLE 3 ABOUT HERE

An analysis of the inferential statements was conducted. It was determined that the students who received all or parts of the thematic organizer inferred attributes (e.g., described characteristics of the reformers, such as writing books to tell people about unfair conditions) and goal statements (e.g., defined the role of the reformers). Causal and conditional relationships about the thematic concept were presented when they explained why the reformers wrote books and wanted to help the people, and the changes that were needed. Few inferential statements were made by the students in the comparison group and there seemed to be no pattern to their responses. Their inferences were mostly at the subordinate level and unrelated to the thematic concept of the passage.

Discussion

As indicated by the data analysis, students who received the complete organizer (i.e. both sections) performed at a statistically higher level on inferential recall than did the students in the comparison group. These subjects used pre-existing knowledge (information about the thematic concept) to elaborate on the implied concept of the text. The most powerful difference on inferential comprehension occurred with the combined treatment for Group A on both trials. Even though students in Group A "forgot" more on the delayed assessment than students in the comparison group, these students had much more information to remember. Their performance on the delayed assessment was quantitatively different (as determined statistically) and their recall units were more complete. The orienting nature of the thematic organizer also seemed to encourage the reader to produce more complete and meaningful restatements of the ideas of the passage and not just attend to the superordinate idea discussed on the adjunct aid. Furthermore, these students were able to relate these text ideas to the thematic concept. The students in the comparison group recalled least important textual units as often as they recalled the more important information. It may be that the level of structural importance was not distinguished by these students. They also tended to respond with one or two word answers rather than complete thoughts. This study also indicated that the extent to which a textual passage is comprehended does not appear to be exclusively dependent upon the reader, the ideas of the author, or the structure of the text.

Instead, the study suggests that the interaction of these can be facilitated when students are encouraged to use their prior knowledge and are given an alternative structure to impose upon the text.

EXPERIMENT 2

In order to increase generalizablity of results and to control for passage effects, this second study involved six different social studies passages which were used during six teaching sessions. The purpose of the study was to determine the effect of the thematic organizer treatment on literal and inferential comprehension on each of the selected passages.

Sample

The sample consisted of twenty-four fourth, fifth, and sixth grade students who were classified as below average readers by their classroom teachers and performance on the Gilmore Oral Reading Test, Form C (1968), oral accuracy subtest (stanines 2 and 3). These students were enrolled in an after school reading tutorial program. The tutors for this program were undergraduate and graduate students enrolled in advanced reading methodology courses. These tutors conducted the instruction for this study. Stratified randomization by stanine level was used to place all students in one of two groups. Four weeks prior to the study all students were pretested on five concepts, one of which was the thematic concept of the sixth passage (i.e. reform). None of the students could discuss or define this concept.

The tutors were assigned to the students through randomization with replacement. The tutors for each group were given

scripts to follow and were unaware of the nature of the research study. Observation of tutors' performance (through one-way mirrors) indicated little deviation from the script procedure, r. = .99.

Materials

Six expository passages were selected from multiple social studies texts. Each of the passages were judged to be written according to the descriptive top-level structure. Each passage contained at least one implied thematic concept. The levels of structural importance and action/description content were equally distributed throughout each passage. The paragraphs of each passage were numbered for the reader. A thematic organizer was prepared for each passage and contained both of the sections that were described in Experiment 1.

Procedure

For three weeks during two one-hour tutoring sessions a week, the students were presented with a textual reading. In each session, Group A received the thematic organizer and text, and Group B received prereading questions and text. To answer the prereading questions the students were required to discuss the targeted concept and predict the meaning of the passage. For example, with the "Reformers" passage the students were asked if they knew anything about reformers or if they knew the meaning of the word before being encouraged to predict what they might learn in the passage. Any answer (or lack of answer) was accepted by the tutor. Students in both groups were told that they would be asked to answer a set of questions after they completed their reading. This procedure varied on the sixth day, when the

students were informed that they would be asked to retell the passage and answer a set of questions. The questions were open-ended, requiring short answer responses, with five designated as literal and five designated as inferential as judged by three independent raters, r = .96. The "Reformers" passage was selected for the sixth passage. Time for reading the organizer and passage for Group A and for discussing the prereading questions and reading the passage for Group B was recorded. Recall was assessed immediately after the reading. For the sixth session, recall of information was also evaluated two days later.

Analysis of the data

The data collected for this study were in two forms. First, scores on five literal and five inferential questions were computed daily over the six sessions and passages. Scores on the questions for the sixth passage were also recored during the two-day delay session. Secondly, retelling scores were calculated for the sixth and two-day delay sessions. The question data and retelling data were evaluated by three independent raters (inter-rater reliability was .91 and .94 respectively).

To analyze the difference between the groups' scores on the comprehension questions for each of the six passages, a one-way analysis of variance was used. The raw scores on literal, inferential, and total questions for each session were used in the analysis and a significance level of .05 was established.

The analysis of the data indicated the following. On day 1, there was no significant difference between the groups on literal and inferential questions. On day 2, there was no significant difference between the two groups on literal compre-

hension, but a significant treatment effect occurred on inferential comprehension. On the remaining days and passages, there was a significant difference in favor of the thematic organizer treatment between the groups on both literal and inferential questions.

INSERT TABLE 4 ABOUT HERE

A two-way ANOVA with two factors (groups and trials) with one repeated measure over trials was used to analyze the data collected on the sixth and two-day delay sessions. On the literal retellings, a significant main effect for the treatment group was found on literal comprehension, F, (1,22) = 5.49, $p < .03$. (Combined means for trials 1 and 2 were: Group A = 15.04 and Group B = 8.96).

As a follow-up to the overall main effect a one-way ANOVA revealed no significant differences between the groups on literal comprehension for trial 1 (F = 2.00, df = 1/22). Significant differences were found in literal retellings in trial 2 (F = 9.94, df = 1/22, $p < .005$).

On the inferential retelling data a significant treatment effect was found across groups and trials for responses at the inferential level, F (1,22) = 19.46, $p < .001$. (Combined means on repeated measures were: Group A = 6.08 and Group B = 0.50). A one way ANOVA indicated significant differences on inferential retellings on trial 1 (F = 15.5, df = 1.22, $p < .001$) and on trial 2 (F = 14.4, df = 1.22, $p < .001$).

INSERT TABLE 5 ABOUT HERE

An analysis of the literal question data revealed significant differences across groups and trials among group means on literal recall questions, $F(1,22) = 21.30$, $p < .001$. (Combined means for trials 1 and 2 were: Group A = 2.50 and Group B = 0.96.) A one way ANOVA revealed significant differences in literal questions between the two groups on trial 1 ($F = 5.53$, $df = 1/22$, $p < .03$) and on trial 2 ($F = 41.1$, $df = 1/22$, $p < .001$).

A significant difference was found among group means on inferential questions across groups and trials, $F(1,22) = 92.57$, $p < .001$. (Combined means on repeated measures were: Group A = 3.58 and Group B = 0.62). A one way ANOVA found significant differences between the two groups on inferential questions on trial 1 ($F = 67.7$, $df = 1/22$, $p < .001$) and on trial 2 ($F = 48.5$, $df = 1/22$, $p < .001$).

INSERT TABLE 6

Significant differences were found among group means on total questions (literal and inferential combined) across groups and trials, $F(1,22) = 75.65$, $p < .001$. (Combined means on both trials were: Group A = 6.08 and Group B = 1.58). A one way ANOVA found significant differences in total questions between the two groups on trial 1 ($F = 51.5$, $df = 1/22$, $p < .001$) and trial 2 ($F = 58.8$, $df = 1/22$, $p < .001$).

INSERT TABLE 7 ABOUT HERE

No interaction occurred for time which indicated that time was not a factor related to different performance between groups. No significant Groups X Trials interaction was found, therefore the decreases in delayed recall were similar between the two groups.

As in the first experiment, the data were analyzed to determine if the groups differed in recall of structurally important ideas. As noted above, the experimental group performed significantly better on most of the measures of literal comprehension (four of the six passages) than the comparison group. An analysis of the retellings for the sixth passage revealed that the experimental group recalled more of the most important idea units. The percentage of most important idea units recalled by students in Group A was 63% and 62% on Trials 1 and 2, and for Group B, 44% and 29% on the same trials. More than half of the responses given by Group B were of least important idea units. The study of the textually implicit units indicated that the treatment students generated attribute, goal statement, and causal and conditional units as found in Experiment 1. No pattern could be discerned for Group B, since so few inferential statements were given by these students.

When students' idea units on the retellings were compared for the degree to which they preserved the meaning of the original text unit, the units across groups differed. Students receiving the treatment recalled more complete propositions than

students who were in the comparison group. Responses of students in the treatment group were rated as having high meaning retention and completeness. In trial 1, 94% of responses given by students in Group A and 68% of respnses given by students in Group B were rated as 3 (complete restatement) or 2 (nearly complete restatement). On Trial 2, a difference also occurred in favor of the experimental group, with 68% of responses of students in that group compared to 58% of responses of students in Group B rated as a 3 or 2.

Discussion

The results of this second experiment indicated statistical difference in favor of the treatment across days and text passages. Students who received elaborations on the thematic concept as related to their prior knowledge were able to elaborate on the textually explicit and implicit information. The thematic organizer seemed to facilitate a more complete recall of structurally important text ideas. As was noted in the first experiment, the students who received the thematic organizer seemed to be able to impose their own structure on the text to aid their comprehension and recall. Students in the comparison group who had the same amount of practice with the text passages and who had the benefit of prereading questions on the thematic concepts remained significantly different from the treatment students on most of the measures of comprehension.

GENERAL DISCUSSION

The overall results of these experiments favored the use of a thematic organizer to facilitate reading comprehension and recall. Teaching the central idea by relating it to students' schema prior to reading with a prose passage that was written on a comparison top-level structure aided textualy explicit comprehension on four of the six passages and textualy implicit comprehension on five of the six passages. Across passages and trials, students in the treatment groups produced more meaningful and complete statements about the passage and recalled more important structural units. Students in the comparison group did not seem to distinguish among the levels of structurally important ideas.

When asked to recall information two days after a treatment, the students who received the thematic organizer recalled fewer units of textually explicit and implicit information than they did on the day of the treatment. However their recall remained quantatively and qualitatively higher than students in the comparison group. Two days after the treatment, students in the organizer group retained an accurate definition of, and were able to explain, the thematic concept and its related details. The students in the comparison group were unable to explain the theme and recalled isolated details.

Our findings seem to support and extend findings of earlier studies. If students use the author's top level structure, comprehension and recall can be improved (e.g., Alvarez, 1980; 1983; Bartlett, 1978; Elliot, 1980; Meyer, Brandt, and Bluth, 1980). It seems that use of top-level structure helps

students to organize information as they recall the text ideas. Furthermore, this study seems to argue in favor of the conclusion of Reder and Anderson (1980) that knowlege of central ideas facilitates recall of less important ideas and details.

As Brandt (1978) suggested, ideas in comparison passages are related to each other as well as to a superordinate idea. The comparison structure of the thematic organizer related the superordinate and subordinate ideas of the passage to the thematic, central concept. The explicit relationship among these ideas "may serve as a retrieval cue for other ideas, and these will be reltated to the idea first recalled" (Brandt, 1978, p.8) Presenting a comparison structure seemed to encourage students to reorganize the descriptive (text) structure, and facilitate an active and greater "depth of processing" (Craik and Lockhart, 1972). The more complete retellings of the students in the treatment group seemed to indicate that they were analyzing the content more fully to process it more deeply. A similar conclusion was made by Alvermann (1981) in her study of the effects of graphic organizers which were organized according to a comparison top-level structure. The various examples of the thematic concept on the organizer that were read prior to and during the text reading in these studies may have facilitated multiple processing of the information.

Earlier studies indicated that advance organizers may aid good readers more effectively than poor readers (e.g., Luiten, Ames, and Ackerson, 1980). Our study indicated the positive influence of thematic organizers on poor readers' comprehension. It may be that poor readers tend to read for details or compre-

hension of simple sentences and fail to integrate ideas across sentences or paragraphs (e.g., Spiro and Tirre, 1979). The thematic organizer seemed to help these readers assimilate and integrate "new" information with concepts already in their prior knowledge. While integration of ideas was not measured explicitly in the analysis of the data, an inspection of the students' retelling scripts indicated that students who received the organizer treatment were able to generate inferences which related their knowledge of the thematic concept (as presented on the organizer) to the superordinate and subordinate ideas of the passage. They generated statements which related parts of the passage to one another and/or to their prior knowledge. Furthermore, these students were able to integrate their prior knowledge and explicit information to produce more complete, meaningful restatements of the text ideas.

For these studies, students were told to read the text adjunct and text passage without additional instruction or explanation. It is important to note that these poor readers could depend upon these written materials alone to aid their comprehension. In a regular instructional setting, the teacher may choose to supplement the organizer with discussion and/or explanations and this may serve to further enhance the quality of the students' comprehension. However, this organizer can be used independently by poor readers to enhance their comprehension as illustrated in the studies reported here.

A number of factors have been identified which influence the probability of integration in memory. One of these factors is the "degree of correspondence and similarity of related facts"

(Walker & Meyer, 1980, p.424). One purpose of the thematic organizer was to illustrate the correspondence among the text ideas. The elaborations which were presented during encoding may result in long-term retention of the information. Retrieval of information is facilitated by the clarity of the input during encoding, and retrieval of integrated ideas may be the result of a presentation of the relatedness of ideas during encoding.

Reder (1980) indicated that there are three goals which need to be accomplished to improve students' comprehension. These include: (1) train students to automatically infer the implicit information intended that is likely to be necessary for comprehension of subsequent input; (2) teach students to isolate those aspects of the text that seem important and elaborate upon them at the expense of full attention on aspects that seem of less consequence; and (3) ensure that students have sufficient knowledge of the concepts referred to in the passage so that they may draw required inferences and further elaborate upon the input", p.46.

We believe that the procedure for our experiments responded to Reder's three goals. First, the comparison and elaborative top-level structure of the organizer prepared the students to understand the implied thematic concept of the passage and its relationship to subsequent text ideas. Second, the organizer emphasized the meaning of the superordinate ideas of the passage to the expense of the numerous details of the passage. Even so, the students who received the organizer often recalled more of the details in a more complete form. Third, it seemed that the students in the experimental groups had

sufficient knowledge of the central concept since they were able to generate plausible inferences and elaborate upon the information that was presented.

The study extended previous research by presenting a definition of the thematic organizer, specifying the steps to construct a thematic organizer, and describing the structure of the text that was targeted. The specific nature of students' recall were analyzed and reported. The findings of this study indicated that it is not enough that learners be alerted to new information prior to reading. Learners need to discern some unifying pattern of events and ideas before the message of the text becomes predictable.

GENERAL IMPLICATIONS

The findings of this investigation should be limited to the following factors. The subjects in both experiments were taught in small groups outside of their regular classroom. This arrangement was not atypical, however, for their schools' remedial reading programs. Second, although the social studies passages were randomly selected, any generalizations should be limited to the sample materials (and the structure of these) that were used in this study. Third, recall of information was not assessed for changes over a duration of time. Additional research is needed to address how recall may change over significant periods of time.

IMPLICATIONS FOR THE CLASSROOM

For these studies, we attempted to define a precise and clear procedure for developing a thematic organizer. We hoped that a "simple" representation of the problematic text structure and the organizer structure would clarify the issue for classroom teachers. It was anticipated that a clear and specific definition of the elements on the organizer would encourage teachers to develop such organizers for use in their instruction.

An analysis of the individual protocols provides further insights for the use of these in the classroom. Overall, the thematic organizer produced favorable gains in textual comprehension for poor readers, but individuals differed in their use of these. For example, the need for thematic organizers seemed to vary according to learning needs of the student. Students with limited prior knowledge or inability to activate prior knowledge seemed to rely more heavily on the information presented on the organizer. Students with extremely low comprehension may need to have more that one major concept defined prior to reading. The need for the organizer also seemed to depend on the structure of the text. Highly abstract concepts required students to refer to information on the organizer more frequently to "understand" the text message. Also, while this strategy may be appropriate for poor readers, it is seen only as one of several alternatives to facilitate comprehension and recall of text ideas.

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APPENDIX

Thematic Organizer

Have you ever tried to change something that you thought was unfair? What would you think if the principal told you that you had to go to school every Saturday? Or what if you (at age 8 or 10) were told that you had to work in a factory? What if you had to work six or seven days a week for twelve hours a day?

You may think that these things are unfair. You may want to make changes so that you would not have to do any of these things. If you want to make these changes you could say that you want to reform things that are unfair. Reform means to change what is unfair.

A long time ago people were treated unfairly where they worked. Some people tried to reform or change what was unfair. These people were called reformers. The reformers were also called muckrakers (muk'ra ker).

The reformers wanted to change what was unfair. In the passage that you will read, children had to work in factories. Factory workers worked 12 hours a day, 6 or 7 days a week and only made 15 cents an hour. What do you think the reformers wanted to do in the following sentence? "The reformers wanted to change the working conditions in the factories". (Write your answer here) _____

_____

_____

The reformers tried to make changes to help people. These reformers tried to help the poor people to make a good living.

These reformers wanted everyone to have a fair chance to make a living.

Some people who lived on farms were poor. These poor people could not own their land. They did not have much money for food or houses. What do you think that the reformers wanted to do for these poor people? (Write you answer here) _____

_____

_____

You will read about people who tried to change what is unfair. Find out what they wanted to change or reform.

DIRECTIONS:

Below are statements that relate to the reading. After each statement is a paragraph number which may help you make your decision. If you agree with the statement put a check (√) mark in front of it. If you disagree with the statement leave it blank. You may look at the reading passage as often as you wish. You can read these statements before and during your reading.

_____1. A muckraker is the same as a reformer.

_____2. A muckraker is a person who tried to change what is unfair (see paragraph 2).

_____3. Reformers said that big businesses were helping the poor people (see paragraph 2).

_____4. Some reformers, such as Ida Tarbell and Lincoln Steffens, tried to help little companies stay in business (see paragraphs 2 and 3).

_____5. Reformers did not want laws made to help the working people (see paragraphs 3, 4, and 5).

_____6. Some reformers wrote books to change the working conditions of the working people (see paragraphs 4, 5, and 6).

Table 1

N = 86

Means and standard deviations for literal and inferential retellings by students in four treatments

	Trial 1				Trial 2			
	Literal Retellings		Inferential Retellings		Literal Retellings		Inferential Retellings	
Treatments	M	S.D.	M	S.D.	M	S.D.	M	S.D.
Group A n=22 Total Thematic Organizer plus Text	15.2	17.1	10.1	7.9	11.3	11.5	5.9	3.9
Group B n=22 First Part of Thematic Organizer plus Text	15.3	14.9	4.1	3.4	11.1	13.5	3.6	2.9
Group C n=21 Second Part of Thematic Organizer plus Text	19.4	14.8	3.8	3.5	14.0	14.2	3.1	2.4
Group D n=21 Text	16.0	15.9	1.1	1.8	7.3	6.9	1.1	1.8

Table 2

Percentage of idea units according to level of importance recalled in trials 1 and 2

	Trial 1				Trial 2			
	Levels of Importance							
Treatment Group	4	3	2	1	4	3	2	1
Total TO plus Text	32	30	22	16	38	28	18	15
First Part TO plus Text	38	30	22	10	42	39	13	7
Second Part TO plus Text	34	31	22	13	44	31	18	8
Text	30	32	16	22	28	28	14	31

Table 3

Percentage of complete propositions recalled

in trials 1 and 2

	Completeness of restated propositions							
	Trial 1				Trial 2			
Treatment Group	3	2	1	0	3	2	1	0
Total TO plus Text	26	42	24	8	28	33	35	5
First Part TO plus Text	46	25	25	4	35	30	33	3
Second Part TO plus Text	36	24	38	1	19	21	59	1
Text	19	21	59	1	20	20	57	3

Table 4

Means and standard deviations for literal, inferential, and total questions over six trials

N = 24

	Thematic Organizer & Text n=12		Prereading Questions & Text n=12		Thematic Organizer & Text		Prereading Questions & Text		Thematic Organizer & Text		Prereading Questions & Text	
	Literal Comp. Questions[a]		Literal Comp. Questions[a]		Inferential Comp. Questions[b]		Inferential Comp. Questions[b]		Total Comp. Questions[c]		Total Comp. Questions[c]	
Trials	M	S.D.	M	S.D.	M	S.D.	M	S.D.	M	S.D.	M	S.D.
Day 1	1.83	1.11	1.33	1.07	1.58	1.24	0.92	1.24	3.42	2.10	2.25	1.76
Day 2	2.33	0.98	1.50	1.50	2.75	1.14*	1.33	1.43	5.08	1.78***	2.83	2.82
Day 3	3.83	1.27**	2.58	1.24	3.75	1.29*	1.61	1.27	7.58	2.19*	3.75	2.04
Day 4	3.67	1.23	2.92	1.62	2.42	1.08*	0.75	0.62	2.42	1.08*	0.75	0.62
Day 5	1.92	0.90****	1.00	1.12	2.67	0.98*	1.17	1.27	4.58	1.68*	2.17	2.29
Day 6	2.42	0.79***	1.42	1.24	3.83	0.83*	0.42	0.99	6.25	1.14*	1.83	1.70

[a] Maximum score = 5

[b] Maximum score = 5

[c] Maximum score = 10

*p < .01
**p < .02
***p < .03
****p < .04

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Table 5

Means and standard deviations for total retellings

Treatment Group	Literal Retellings				Inferential Retellings			
	Trial 1		Trial 2		Trial 1		Trial 2	
	M	S.D.	M	S.D.	M	S.D.	M	S.D.
Thematic Organizer and Text n = 12	17.50	7.67	12.58	5.76	7.75	5.80	4.42	3.82
Prereading Questions and Text n = 12	12.50	9.52	5.42	5.37	0.83	1.80	0.17	0.57

Table 6

Means and standard deviations for

literal and inferential questions on sixth trial

Treatment Group	Questions							
	Literal Questions				Inferential Questions			
	Trial 1		Trial 2		Trial 1		Trial 2	
	M	S.D.	M	S.D.	M	S.D.	M	S.D.
Thematic Organizer and Text n = 12	2.42	0.79	2.58	0.90	3.83	0.84	3.33	0.89
Prereading Questions and Text n = 12	1.42	1.24	0.50	0.67	0.58	1.08	0.67	0.98

Table 7

Means and standard deivations for

total questions across six trials

Treatment Group	Trial 1		Trial 2	
	M	S.D.	M	S.D.
Thematic Organizer and Text n = 12	6.25	1.14	5.92	1.62
Prereading Questions and Text n = 12	2.00	1.70	1.17	1.40

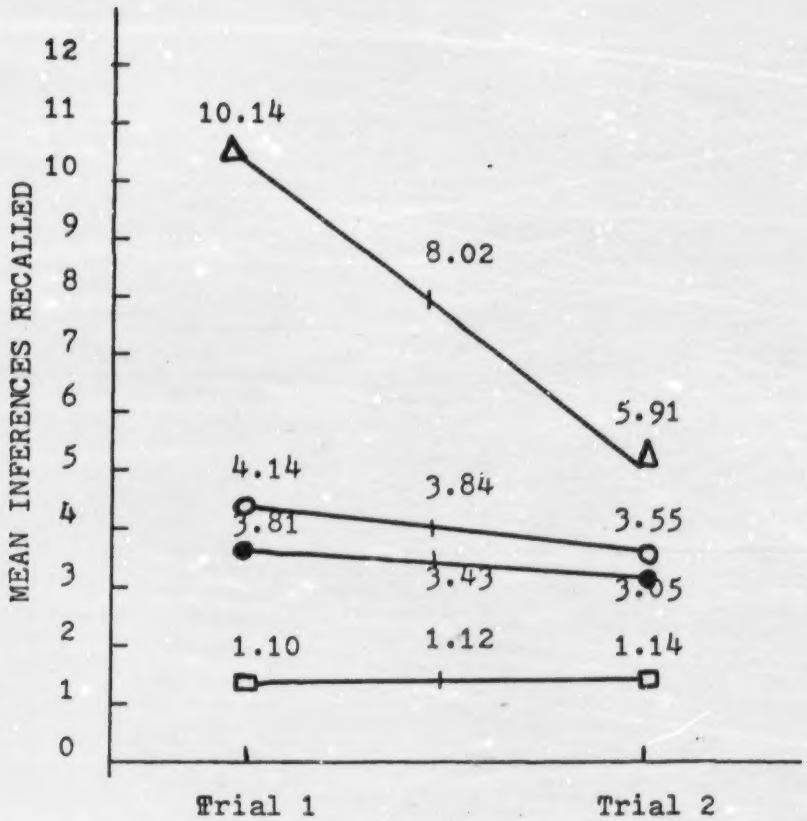

Figure 3. Interaction of mean inferences recalled

GROUP A = △

GROUP B = ○

GROUP C = ●

GROUP D = □